

THE
SEAMAN'S GUIDE;

SHEWING
HOW TO LIVE COMFORTABLY
AT SEA.

CONTAINING,
AMONG OTHER PARTICULARS,
COMPLETE DIRECTIONS FOR
BAKING BREAD,

Either with Yeast or Leaven, in all Situations.

RECOMMENDED ALSO TO
PUBLIC BAKERS,
AS WELL AS TO
PRIVATE HOUSEKEEPERS.

BY THE HONOURABLE
JOHN COCHRANE.

LONDON:
PRINTED FOR J. MURRAY AND S. HIGHLEY,
NO. 32, FLEET STREET.

1797.

THE

SEAMAN'S GUIDE

HOW TO LIVE ON BOARD
A SHIP

BY

AMONG OTHERS PARTICULARS

COMPLETE DIRECTIONS FOR
BAKING BREAD

BY

PUBLIC BAKERS

PRIVATE HOUSEHOLDERS

BY

TO THE RIGHT HONOURABLE

EARL SPENCER.

MY LORD,

To a benevolent mind the possession of power derives its principal value from the means it affords of doing good; and, above all, of relieving the distresses, and preserving the lives, of valuable members of society. I am, therefore, encouraged to dedicate, and solicit your Lordship's patronage to this pamphlet; written on an important subject, which, I know, has already engaged your Lordship's attention; and on which any hints that may be matured into a salutary system, you, my Lord, will not disdain. It has for its object the health and comfort of the British seamen, and of course

the dearest interests of our country. If what I have observed shall appear to merit consideration, it may, perhaps, be thought advisable to submit the improvements I propose to a committee of men versed in chemistry (not a few of whom I have already consulted), who may follow them up with experiments that may tend to prove their practicability and advantage; of both of which, having been bred to a sea life, I am, myself, thoroughly persuaded.

Innovations of all kinds, of opinions, customs, dress, modes of living, and so on, pass from the higher to the lower classes of mankind; from superiors to inferiors. The improvements proposed will then only be universally adopted by the great body of seamen when they shall be universally practised by the officers. It is fortunately in your Lordship's power not only to prove and establish the system here recommended, but also, by your influence and authority in the
 navy,

navy, to secure their circulation and general acceptance.

Many improvements, proposed by landmen, have been rejected from their excessive encroachment on the stowage of the ships. Those now submitted to your Lordship, instead of requiring any extra tonnage, will, under due management, in some instances, be, in this respect, even a saving.

I have the honour to be,

MY LORD,

With the greatest respect,

YOUR LORDSHIP'S

Most obedient, humble servant,

JOHN COCHRANE.

have to secure their circulation and general

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THE
SEAMAN'S GUIDE.

As bread is the staff of life, forming the greatest proportion of the sustenance of mankind, it is very singular, that in all the books on domestic economy, and even on cookery, the art of baking bread has not been sufficiently examined and explained, or directions properly given for baking, either with yeast or leaven, according to the situations in which people are placed. In countries where wine is the beverage of the inhabitants, or where no malt liquor is brewed, the use of leaven is general; but where beer is the beverage, yeast is in such use, that the mode of baking with leaven is unknown; inso-much that, on the late stopping of the distilleries, the bakers of this country were, as in the summer months, particularly, they often are, reduced to great difficulty and expence in procuring it.

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The following treatise, the result of many experiments and actual practice, is given to the public with the view of rendering the principles of baking clear to the meanest capacity, by giving such directions for baking with yeast or leaven, as will enable either public bakers, private families, camps, men of war, or merchantmen, to supply themselves, in all situations, with soft bread of the best quality. And as the bakers of Great Britain are accustomed to bake with yeast, some late discoveries will be communicated for producing that necessary article in an easy and cheap method. Of late years, the attention of the public has been turned to yeast; and various proposals have been made to government for some recompence, or reward, for disclosing the inventions of individuals for making that ingredient. Why these methods, if such there are, have not been made public, is still a secret. But as the plan to be recommended costs little, is easily effected, and is in actual practice with the bakers in Edinburgh, it only requires to be properly made known to be in general use. All the bread used at the camp of Dunbar, last summer, was baked with yeast made in this manner, and was remarkably

markably good, as can be certified by all the officers of that camp. The receipt will be hereafter detailed. But it may be necessary to enter here into the general principles of fermentation, in so far as it respects the subject under discussion.

There are three stages of fermentation through which bread or flour can pass; the *vinous*, the *acetous*, and the *putrid*. If water is added to flour, it immediately enters into the vinous; from whence it almost instantly goes into the acetous fermentation. The first stage, viz. the vinous fermentation, shall be here denominated *yeast**; the second, or
acetous

* N. B. The term yeast, here applied to flour in the vinous fermentation, is not meant to signify, that the mass is wholly converted into the substance so termed, arising from fermented malt liquor, and of which a *small* quantity only is obtained; but to distinguish it from leaven. The nature or essence of yeast, or barm—how produced, and from what part of the grain it arises—has never yet been properly examined and explained by scientific men. When once produced, it can be preserved for a great length of time, even in a dry state, and resume its activity when added to water, and any substance capable of fermentation. Without a little of this substance to set the fermentation agoing, it is tedious and difficult to create yeast anew, and requires more nicety and patience than can be expected from the bulk of mankind. It is therefore recommended, to begin with some fresh yeast,

acetous fermentation, *leaven*. Each of these possesses the singular and astonishing power of communicating fermentation, under proper regulations, to any quantity of flour, and may be continued for ever. As flour and water almost immediately go from the vinous into the acetous state, the addition of hops has been found to have the same effect in preserving the vinous fermentation in flour, as it is well known to possess in preserving malt liquor from becoming acid. This discovery was made, about eighteen months ago, at Edinburgh. It is said, that it was known to a baker there, who practised it for many years. But, having quarrelled with some of his workmen, they disclosed the secret to other bakers, on their paying them a sum of money. At that period yeast was very scarce, owing to the suspension of the distilleries; and, as the Edin-

and continue it from one baking to the other, and, in case of any accident of losing it, to be provided with some in a dried state; a very small quantity of which will answer the purpose. A bottle or two of porter or strong ale, or the grounds of a cask of beer, will, with care and attention, serve as a substitute for yeast to make a beginning with. But the dried substance of yeast, as now put up and sold in cannisters, is by far the simplest method of obtaining that useful article.

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burgh bakers were ignorant of the method of baking with leaven, the discovery was very acceptable, and by that means became very generally adopted in Edinburgh.

In baking with yeast, when it is in a good vinous state, and in an abundant quantity, the operation is soon performed; the flour, in this case, being seldom mixed up oftener than twice; that is to say, the yeast is added to half the flour, and well kneaded, and is then allowed to sponge and rise in the trough; next the other half of the flour is added, with a sufficient quantity of water to make it into dough, and then allowed to ferment and rise; when it is again well kneaded, and made into loaves.—The most intelligent bakers divide the flour into three parcels, one consisting of a half of the whole, and the other two of one quarter each; they first mix one quarter of the flour with the whole of the yeast; this they call setting sponge. Suppose this to be done at eleven in the forenoon, at about two o'clock in the afternoon they mix in another quarter of the flour, and knead it very well; about nine at night they mix up the remaining half of the flour, and work it very well up, and let it stand until one or two in the

morning, when it is made into loaves, and put in the oven. By proceeding in this way a much less quantity of yeast is sufficient, and the bitter taste of hops entirely prevented. Nay, if the quantity of yeast is very small, or very bitter from too much hops, the flour may be divided into four, five, or six equal parts: the yeast being mixed and well kneaded with one of these parts, will successively raise and ferment all the rest; provided that particular care be taken never to mix more flour until the former has completely fermented and rose. When all the flour has fermented so as to be ready for baking, let it be divided into loaves; but do not put them immediately into the oven, as, from the pressure of the hand in forming them, they would not rise properly; but let them remain until they begin to rise and expand, which they soon will do, and then put them into the oven to be baked.

In case of a succession of bakings, as in a camp, on board a ship, or elsewhere, when once a large batch of dough is properly fermented, it may be divided into several parts, either to form new batches, or part baked, and the remainder reserved to form the next baking. The quantity to be reserved will

depend on the number of bakings required; and can be easily managed to come regularly in succession to one another. If this mode is followed, no more yeast will be required; and thus the principle of baking with leaven is clearly explained.

Leaven is simply, as above observed, flour in the acetous fermentation. It has the same property as the vinous of communicating fermentation to any quantity of flour, when assisted with water. To do this, it is necessary to keep a piece of dough of a former baking, which may be preserved for several days; but which ought not to be kept too long, otherwise it will get into the putrid fermentation. This piece of sour dough must be mixed with flour and water, and allowed to ferment and rise; when more flour and water must be added, until a sufficient quantity is made for baking. A few experiments are necessary to ascertain the quantity of dough to be preserved. If too much dough is kept, and it is very acid, the bread will be sour; if too little, and that sufficient time be not given to rise and ferment the dough, the bread will be heavy. It is from inattention to these circumstances, that the bakers of this country, whenever they attempt to bake with leaven,

are certain to make heavy sour bread ; while other nations use nothing else, and make it excellent. The reason is, that English bakers, accustomed to bake with yeast, proceed in the same way with leaven. They use too much of it, and do not mix it up a sufficient number of times in order to overcome the acidity, and thereby change the acetous fermentation into the vinous state ; which is the case when properly conducted *. It has been already stated, that the vinous fermentation lasts a very short period in flour : in order to continue it, fresh flour must be added from time to time. This circumstance deserves minute attention, for on it depends the whole art of baking properly. There is no necessity of ever allowing the dough to go out of the

* The author is well aware that it is the opinion of some chemists, that a different process of fermentation takes place in baking with leaven, than when yeast is employed ; that, in the former case, the flour is not brought into a saccharine state, nor undergoes the vinous fermentation, but passes directly into the acetous ; which, when once begun, is supposed not to be convertible into the former. It is not the object, at present, to enter into these nice chemical theories, but merely to state facts, to draw the attention of more able men to this interesting subject, in whose hands the explanation of the phenomena is left.

vinous

vinous into the acetous fermentation ; for, by adding flour from time to time, the vinous will be preserved. A baker has only to keep a piece of dough of his last batch, and mix it up with fresh flour and water ; when it ferments and rises, mix more flour, &c. until the next baking. By following this process, he need be at no further expence for yeast, and will make excellent bread. The proper period to mix more flour, and also to judge when it is fit to be put into the oven, is, when the dough begins to sink and fall a little. It must not be allowed to remain long in that situation ; otherwise it will go rapidly into the acetous state. The only difficulty to be overcome, is, the indolence and obstinacy of the common workmen, who must, at stated times, mix more flour to freshen the leaven. In London, where the price of labour is very high, and where labourers work very hard, particularly in the baking line, in which the men are at work almost the whole night, it would not be easy to get workmen to attend to this mode ; and this the rather as mankind are bigotted to old customs. What their fathers did they also wish to follow. There cannot be a stronger proof of the want of reflection and thought in the generality

nerality of mankind, than the ignorance and want of knowledge of the principle of baking all over the kingdom. For although there are several bakers in every parish, and these men, in general, be superior in intelligence to the lower order of people; yet they do not seem to give the necessary attention to their business, or gain experience by their daily practice; otherwise they would not be so foolish as to be at a considerable expence in purchasing of yeast to set fresh sponge every day. They all know enough of their business to mix up the remainder of the flour with the dough already fermented with the yeast; and they see that it has the property of communicating the fermentation to the whole mass: but, when that is done, the whole is put into the oven, and they begin the next day with fresh yeast. The idea of continuing the fermentation from that batch to another, or to the next day, is an exertion of mind beyond them; although they see it every day before their eyes in the process of raising their usual quantity of bread. This ignorance, or want of attention, is not confined to the bakers of this country who bake with yeast, but also extends itself to those in foreign countries who bake with leaven. They
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reserve only a small lump of dough of the former batch, which they allow to four, and go into the acetous fermentation, and begin their new batch with it. This is a bad mode of proceeding; for as the same quantity of dough is generally kept to become leaven, and all leaven is much affected by the weather, it may sometimes become too acid, and make the bread sour; or it may not have fermented sufficiently, and thereby occasion the bread to be heavy. All these objections or difficulties are obviated by reserving a certain quantity of the former dough, according to the extent of the baking required, and from time to time mixing it up with fresh flour, according as it rises and ferments. By this mode of proceeding, the bread must be entirely free either from the acidity often the consequence of leaven, or from the bitterness of hops arising from yeast.

Another circumstance which deserves attention, is, the quality of the flour, whether fine or coarse. The generality of mankind imagine that it is all the same substance, with the difference of being coarse or fine; but, on investigation, it will be found that it is very different. The bran forms the outside coating of the wheat. Immediately
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under it is that part of the wheat which forms the coarse flour, is of a soft nature, and not capable of being easily reduced to a fine flour. This substance constitutes about one half of the grain, is of a sweetish taste, and, if taken alone, with difficulty rises and ferments with leaven or yeast. The kernel or heart of the wheat is a hard substance, and almost transparent; is capable of being reduced to a very fine powder, and ferments easily. The French term it *Roulan*.—In the East Indies, where it is separated by their particular mode of making flour, it is called *Soojah*, and resembles fine sand. The millers in this country, from ignorance, often sold this at a low price, under the name of *Sharps*; whereas it ought to be returned to the mill and ground, as containing the finest part of the flour. It is the substance that makes the best and finest maccaroni and vermicelli, and may be separated at the mill, by setting the stones so as to yield half the weight of the wheat in flour. The roulan, in bolting the flour, will come out along with the bran and pollard, and may be then separated by itself. The mode in which it is done in the East Indies is as follows. Flour is ground by hand, with stones of about eighteen inches

inches diameter. The wheat is previously soaked in water. The pressure and force of these stones is sufficient to grind both the bran and the outer part of the grain, which constitutes the coarse flour; but the kernel of the wheat is not reduced to flour, but appears like fine sand. The whole is then sifted; the flour passes through, and the bran, pollard, and soojah, or roulan, remain behind. Women are employed to separate this soojah, which they do with great address, by the means of small winnowing fans. The soojah, or roulan, is used for baking of fine bread, without being reduced to a fine flour, and the flour sold to the common people to make cakes with.

The Indian principle of making flour may be adopted with great advantage in this country. The stones ought to be so set as to yield half the weight of the wheat in flour; and proper machinery constructed for separating the roulan, or soojah, for use; as there is no necessity of grinding that again into flour. By this means the mill will be enabled to grind a third or a half more in the same time, and the stones not require half the picking. The roulan, or soojah, will be found of two different qualities; the one
finer

finer than the other, and nearly of equal quantities. The following experiment was made at Calcutta, in a mill constructed in the European way, with French burr stones of about four feet diameter, with fifty maunds of wheat, of eighty-two pounds each; forty seers to the maund:

FIRST GRINDING.

	Maunds.	Seers.
Finest Soojah, or Roulan	2	17
Second ditto	3	37
Flour	9	16
Pollard	1	31
Bran	0	17
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	17	38

SECOND GRINDING.

Finest Soojah	5	31
Second ditto	3	3
Flour	10	12
Pollard	2	15
Bran	10	0
Loss in weight	0	21
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Maunds	50	0

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RECAPITULATION.

				Maunds.	Seers.
Fineſt Soojah	-	-	-	9	3
Second ditto	-	-	-	7	0
Flour	-	-	-	19	28
Pollard	-	-	-	4	6
Bran	-	-	-	10	17
Loſs in weight	-	-	-	0	21
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				50	0
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Wheat, in Bengal, is by no means ſo good a grain as that in England, either as to ſize or quality; which the author had an opportunity of comparing at Calcutta, as he obtained ſeveral caſks of Engliſh wheat from one of the Indiamen. The Bengal wheat has much more bran than the Engliſh. The proportion of bran in the above experiment is very large; though, with ſome trouble, a little more flour could have been extracted.

In the Eaſt Indies, bread is raiſed and baked by a liquor called *Toddy*, which is drawn from the cocoa-nut tree. As the mode of extracting this liquor, by every information, is either unknown, or not practiſed, in the
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West Indies, where it might not only be valuable on account of the property it possesses of raising flour in the same manner as yeast, but also to promote fermentation in the distilling of rum ; it shall now be detailed.

All over India it is customary to extract toddy from the cocoa-nut trees ; insomuch that it forms a distinct employment or occupation. The liquor is taken from the branches, or, more properly, the fibres, which produce the nut on the top of the tree. One, two, or three of these fibres (seldom more) are cut over towards the end, and a small calabash, or vessel, suspended, into which the end of the fibre is put ; from which a liquor drops. As the liquor ceases to flow, a small piece is cut off the end of the fibre, until it is necessary to begin a new one. The toddy men, as they are called, collect this liquor twice a day, early in the morning, and in the evening. If drank immediately when collected, it is rich and wholesome, and has no intoxicating quality ; but if what is collected early in the morning is kept only two hours after sun-rise, it ferments so quickly, that a quart of it is sufficient to intoxicate a man. In this state it is fit to bake with, in
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the same manner as yeast in this country; and is universally used in all the distilleries of India to promote fermentation. In many places it forms the principal part in the composition of arrack. The Columbo arrack, if not wholly, is chiefly made from it.

The coco-nut tree in India is revered the most useful of any to the inhabitants. The outer part of the tree makes very durable planks, rafters—fit for the building of their houses; the leaves form the thatch, sides of the huts, and mats to lie upon: from the bearing fibres toddy is extracted to make spirits. The husk of the coco-nut makes excellent cables for ships, ropes, and every purpose to which hemp is applied. The nut, when young, yields a delicate food, and pleasant beverage; and, when old, the shell and kernel give a great quantity of oil, which the natives use in their lamps, and to anoint their bodies. The oil is extracted by bruising the shell and kernel very small, and boiling them in water until the oil swims on the surface. It may be also cold drawn. To the above purposes may be also added firing. The toddy, in the state of fermentation, may probably possess the property of

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resisting

resisting and stopping putrefaction, in the same manner that yeast does; and deserves investigation.

It has hitherto been a desideratum to ascertain the real fineness and quality of flour. The great power of machinery at present in use, together with the late improvements in cleaning the wheat before it is ground to flour, enables the millers to grind the coarse flour so fine, that the quality cannot easily be discovered on inspection, either by the fineness of the flour, or even by the colour: and thus the millers are enabled to rob the flour of a certain proportion of the soojah, or roulan. This mode of grinding is very prejudicial, as, from the severe pressure of the stones, the flour is rendered dead; a term and quality well understood by bakers; which always will be the case when the stones are set to finish the grinding at once. The perfection of making flour consists in grinding at different times, and not at once; that is to say, the wheat should be ground, the first time, so as to yield half its weight in flour, part of the coarse bran extracted, and the remainder returned to the hopper to be reground; all the sharps to be constantly
returned

returned to be ground into flour. Flour thus made is far better than that ground at once.

The following experiment, if carefully made, will effectually check all fraud; and is therefore of the utmost consequence to be known to bakers in general, as a complete guard against imposition.

Take a pound of flour properly ground, of a standard quality of wheat, and from which it is certain nothing has been extracted. Moisten it with water, and make it into paste; then knead it in pure water; which repeat in different waters until all the farinaceous parts are washed away, and nothing but a substance, like an elastic gum, remains. Dry this and weigh it; which weight establish as the standard fineness of flour, bolted through a cloth of a certain fineness, on a pound weight. When the quality of any flour is to be tried, proceed in that method, and see whether the proportion of gummy matter is more or less than the standard. If less, it has been robbed of so much of the roulan; and the quantity can be accurately ascertained to the utmost nicety, by any person of moderate capacity. It will also

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discover,

discover, whether the flour has been adulterated by other grains, as wheat is the only grain which contains that glutinous substance to any extent.

The process of making yeast, as practised at Edinburgh, is as follows :

Take two ounces of hops ; boil them for an hour in two gallons of water ; and, boiling hot, scald eight or ten pounds of flour, and stir it very well into a paste. Do this about eleven in the forenoon. Let it stand till six o'clock in the evening ; then add about a quart of yeast, to forward the fermentation, and mix it well together. Next morning add about as much more flour and water, sufficient to make it into dough ; and in the afternoon it will be fit for setting sponge and baking. Reserve always a piece of the old dough to mix with the new batch, instead of the yeast ; which is necessary only the first time, to hasten the process. The above quantity of hops will suffice for an hundred and twenty quartern loaves.

This process, in Scotland, requires about thirty hours ; in a warm climate a few hours would suffice, as fermentation there advances with great rapidity. A due attention

tion must be paid to that circumstance, as every thing depends upon it.

The public mind has of late been turned to the subject of yeast; and various modes have been devised of creating it, some by hops, and others by preparations of malt; also by potatoes. The following letter was received from a gentleman at Edinburgh, who had been requested to obtain some information respecting the particular mode practised by an eminent baker at Leith:

Leith, 5th November, 1796,

‘DEAR SIR,

‘IN answer to your favour of the 31st ult, I beg leave to send, for your information, the following account of the process of making yeast from malt, which I procured from Mr. Gillespie, baker at Leith, who has had it in use for more than a year, and intends still to continue it, in preference to distiller’s barm or yeast,—In the first place, you must have a boiler, cooler, vats, &c. and all the apparatus that would be necessary in a small distillery. Take a boll of the best malt (four bushels), and mash (or mash) it

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in the same manner the distillers do. When strained, put it into a cooler; and when it is of a proper warmth, say about milk warm, let it out into a cask, placed below for that purpose, to ferment. To this liquor add four English quarts of all yeast, to produce the fermentation; and after it has begun to ferment the first time (the froth running over into a receiver for the purpose), throw it back again; and when it has fermented again, throw it back a second time; and it will then, *after the third fermentation*, be fit for use, as you will perceive by its being of the thickness that good yeast ought to be. A boll of malt (four bushels) produces about twenty-four English quarts of yeast. This mode is very expensive and troublesome, as it requires one man's continual attention. But it must be recollected, that one quart of this yeast goes as far as four quarts of distiller's yeast. The first mash takes sixty-two and an half gallons of water. The liquor this produces, you pour off, and add the same quantity of water a second time. The water must of course be near the boil. Two quarts of this yeast will make two hundred quartern loaves, of four pounds five ounces eight penny-

pennyweights each. And Mr. Gillespie finds it answer the purpose so extremely well, that he intends to continue it, although he has it in his power to get distillery yeast at one shilling per gallon; and this yeast costs him from four shillings and sixpence to five shillings per gallon.—The whole process exactly corresponds with the mode adopted by the distillers; and any distiller will understand the mode of making the yeast perfectly well.

‘ Mr. Gillespie, who is a very intelligent, civil man, will give you any further information you may require, I hope what I have stated will prove satisfactory, and that you will believe me always,

Dear Sir,

Your very humble servant,

GEO. ASSIOTTI*.’

* In a subsequent letter from the above gentleman, in answer to some inquiries to what purpose the liquor was applied, he says, that the liquor drawn from the malt was too much impoverished to make beer, as it was tried, and found not to answer: but it was appropriated to another use—the making of vinegar; and for this purpose Mr. Gillespie used to dispose of it to the vinegar makers.

The principle of baking with leaven has been already stated; but it will be necessary now to repeat it more at large.

Take a piece of dough, and keep it for use. It will keep for several days very well. Mix the dough with some warm water, not very hot, and knead it up with some flour, to ferment and sponge. Divide the flour into four parts. Mix a quarter of the flour with the leaven, and a sufficient quantity of water to make it into dough, and knead it well. Let this remain until it ferments, and rises properly; then dilute it with more water, and add another quarter of the flour, and let it remain to rise. Do the same with the other two quarters of the flour, one quarter after the other, taking particular care never to mix more flour until the last has risen properly. When finished, divide it into loaves; and let the loaves remain to rise, in order to overcome the pressure of the hand in forming them. Then put them into the oven, and reserve a piece of dough for the next baking.

It has been already noticed, that dough thus kept might, with proper care, be prevented from going into the acetous fermentation, by mixing from time to time fresh flour.

flour. This practice is particularly recommended to be followed by those persons who do not like any acidity in their bread, or have an equal dislike to the bitter arising from hops. On board a ship this mode may be easily practised, as, from the regularity of keeping watch, the time for mixing the flour can be adhered to with great exactness.

All the large ships, both in the navy and India service, have an oven, as part of the ship's coppers or kitchen. From an ignorance in the art of baking with leaven, very few ships attempt even to bake rolls for the officers, and still fewer to bake soft bread for the ship's company. All the French ships, whether men of war or merchantmen, regularly bake soft bread for the whole ship's company. Nothing conduces more to the health of the crew. A large oven is erected in all the French men of war, in a place of safety, for this purpose, on the orlop deck. However singular this may appear to those that are unacquainted with it, as involving, at first sight, the danger of fire, yet such precautions may be taken as effectually to prevent any danger arising from this cause; and the room it would take up in a large ship would not be of much consequence. Nay,
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the heat arising from the oven might be attended with beneficial effects, by drying and correcting the moist and damp air of the ship.

But, in case that plan is not approved, it would be no difficult matter to contrive a ship's coppers in such a manner as to increase the size of the oven so as, by proper successions of baking after one another, that a sufficient quantity of soft bread might be made for the whole ship's company.

If due attention be paid to the principles proposed by Count Rumford of applying fuel, and adopted in the navy, the baking soft bread for the ship's company will not be attended with any extra expence of fuel; on the contrary, a very great saving may be made, as the present system is a very extravagant one.—Biscuit requires at least four times the stowage room that flour does, is more liable to be destroyed by the wevil and other vermin, and is by no means so wholesome as soft bread. Besides, it requires an hundred pounds of flour to make ninety-two pounds of biscuit; whereas an hundred pounds of flour, such as is put on board a ship, will, with proper care, make at least an hundred and twenty-six pounds of well-baked soft bread;

bread; a difference of thirty-four pounds in an hundred. This circumstance of itself deserves serious attention.

Another improvement, of equal consequence, claims regard, which is, that, at all events, it is in the power of those on board, by taking with them a little hops, or by using leaven, to raise all the seamen's flour puddings; so that they will have a large light boiled loaf, instead of a heavy, indigestible mass. Let any one send to their baker for a piece of dough, just fit to go into the oven, and at the same time mix about the same quantity of flour and water, without being fermented, and boil them, and he will soon see the difference: the first will be as light as bread, and only requires eight or ten minutes to prepare; whereas the other is for ever a heavy, solid mass, although boiled for many hours. This kind of pudding is well known, by housekeepers, by the name of yeast dumplings.

This mode of raising the flour for the puddings is attended with another very beneficial effect, and which also deserves attention—it absorbs and takes up a much greater proportion of water than the simple mixing of flour and water in the common way, without

without fermentation. The increase of weight is therefore very considerable; and, from the number of experiments made by Count Rumford, it is clearly ascertained, that the nourishment of man does not depend so much on solids, as it does on water properly prepared by cookery. Many of his ideas are extremely worthy of the attention not only of the public boards, but also of every captain and officer of the navy, whose duty it is, and who *ought* to take pleasure in every thing that can contribute to the health and comfort of those under their care.

The poor are often debarred from the benefit of an oven from the expence in erecting one with brick and lime. The following method of making ovens, universally practised by every farmer in Canada, is worthy of imitation and adoption, as the poorest person may make one, at little or no expence, with only a little pains and trouble. At a small distance from the house make a platform, of about six or seven feet square, of earth, stone, or wood; raise it about three feet from the ground; procure a quantity of clay, and one-third sand; beat and mix it well with water, to the consistence of making bricks. With this clay cover the top of
the

the square about six or seven inches thick, and level it properly. Provide a number of laths, twigs, or small branches of trees, that will easily bend into any oval shape. On the moist clay mark out the size of the oven; then bend these twigs into the shape and size of the oven, leaving, at one end, a vacancy for the door of the oven, in proportion to the size, sticking the ends of them into the clay. When finished, it will appear like a basket overfet. Then begin and plaster it over with clay, about an inch at a time; and when it has dried a little, lay on more, until it is about eight or nine inches thick. When finished, fill the oven with wood or coals, and set it on fire; and wherever any cracks are seen in the arch, pour in some clay, and plaster it over. The fire must be continued until the whole is burnt to the state of a brick. An oven made in this way, if properly covered from rain, will last a long time. This mode of erecting ovens is now recommended, not only to farmers and cottagers, but also to the army, especially to those in camp, and detached parties, as they can be made in a few hours, and will serve not only
for

for baking of bread, but also for roasting and stewing their meat.

The science of cookery is of infinite consequence to mankind, particularly to the lower classes of people of all countries. There is, perhaps, no country in the world where it is less understood by that class of people than in England. Their whole system of cookery seems to be confined to baking a joint of meat in an oven, when they can afford it ; and when they cannot attain that summit of their desires, they live on dry bread and cheese. Broth, soups, and even the various preparations of milk, the proper nourishment for children, are in a manner unknown in many counties of England.

The poor in Scotland, and on the continent, manage much better. In the first, oatmeal porridge, and milk, constitute their breakfast and supper. When they can afford meat, they form with it a large quantity of barley broth, with a variety of vegetables, by boiling the whole a long time ; enough to serve their family for several days. When they cannot afford meat, they make broth of barley, and other vegetables, with a lump of butter ;

butter; all of which they boil for many hours, and this, with oat cakes or other bread, forms their dinner.

The British seamen are too much fed on solids; and the salted provisions are not sufficiently soaked, or freed of its salt. The only species of soup in use is that of pease soup, and burgoo made of oatmeal; of which, the first, from want of boiling, is not sufficiently prepared.

In Canada the inhabitants live three-fourths of the year on pease soup, prepared with salt pork, which is boiled until the fat is entirely dissolved amongst the soup, giving it a rich flavour. To this they add all kinds of vegetables, bread, or biscuit. The boiling is continued more than double the time that it is done on board a ship. Let the experiment be fairly tried, and then decide, whether the Canadian mode, or that practised in the navy, is the best. If their mode is approved of, it may be easily adopted, by ordering the cook to put the soup on sooner.

The mode of boiling salt provisions with steam, may be also practised in the navy to great advantage. At present it is the interest of the ship's cook to raise the heat of the salt
brine,

brine, in which the provisions are boiled, so as to dissolve and decompose the fat of the meat, which is undoubtedly the most nutritive part, in order to increase the quantity of flush, or grease, which is his perquisite, and amounts, in a large ship, to something considerable. Some compensation ought to be made to the cook, who is generally a seaman that has lost an arm or leg, or otherwise disabled in the service, and a mode adopted of dressing the salted provisions that would prevent any loss of the fat. This may easily be done by suspending the meat on hooks, in a large iron-bound cask, made for the purpose, into which a pipe with steam must be introduced from a boiler. Perhaps it may be necessary to parboil the meat first in salt water. This cask, when done, to be struck down below out of the way, not to lumber the deck.

In former times, when artificial grasses were not in use, it was the practice, in autumn, to kill and salt the family's provisions for the winter. With this salt beef, after soaking it, it was the uniform custom to make broth, with barley and vegetables. The author has frequently eat of it, and
found

found it very good. Why not adopt the same method in the navy? A certain number of pieces of beef, after being soaked and parboiled in the sea water, may be put into fresh water for the broth, along with a quantity of barley, and a proportion of flour fried in butter, pepper, and a little vinegar; and as potatoes, it is well known, can be carried to the East Indies, a proportion of them to be added; first boiled in the salt water, then bruised and put into the broth. A mess of this will be highly relished by the seamen: but care must be taken that the barley be well boiled; if so, it will be like a jelly, and eat very rich. It is in the power of every officer on board to give this a fair trial; and, if found to their taste, ought to be recommended to the men.

It is certainly a difficult thing to get the lower classes of men to alter their usual habits; but as seamen are composed of all countries, it will be easier to effect an alteration of diet, when an example is shewn by the officers, and when they are convinced that it is for their good; and that they are not to suffer any diminution of their allowance; on the contrary, that they will be able to make a considerable saving.

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At one period it was customary to give stock-fish in the India ships; but was not found to answer. The original cost was dear, requiring an allowance of oil, mustard, and vinegar; and the trouble it took in preparing by beating, disgusted the men so much, that at least half of it was thrown overboard. The best fish to carry to sea would be herrings; but they must be cooked in the same manner now practised by the poor people in Scotland. They soak them in water until they become pretty fresh; they are then hung up in the sun and wind, on a stick, through their eyes, to dry; and then boiled or broiled. In this way they eat almost as well as if they were new caught. The poor in England seem totally ignorant of this mode of cooking salt herrings; and are therefore disgusted with that kind of food, owing to the great thirst occasioned by the saltness of the herrings when boiled immediately out of the barrel. It would be a real national advantage were herrings to become more the food of the common people; and ought to constitute a considerable proportion of the diet of the poor-houses in England, and all those maintained at the public expence, whether in gaol, or in the hulks.

The

The famous chemist Glauber, from whose works many of the modern improvements in the prevention of the scurvy at sea have been taken, in his Treatise on the Health of Seamen on long Voyages, recommends the boiling down a number of casks of beer into one; to be afterwards diluted with water, and refermented. The propriety and justness of his ideas on that subject can be verified by every person who has been in the East Indies, and have tasted what is there called country beer. As the process of making this beverage, the author finds, is not sufficiently known, and as it may be of much real utility in the navy, and on all foreign stations, where the troops live on salted provisions, directions shall be now given how to make it, that the meanest capacity may understand it.

To every quart of porter, or strong ale, add two quarts of water, moderately warm. To every quart of this mixture add a table-spoonful of brown sugar, or a wine-glass full of syrup, or molasses. Put the whole into a tub; beat and whisk it with a bundle of rods for at least half an hour; bottle and cork it, and tie the corks down with strings. The pressure of the corks upon the strings will

shew the progress of fermentation, which will be slow or quick, in proportion to the warmth of the weather. In the East Indies fermentation is so quick, that what is made in the evening is ripe next day. When once made, always preserve a bottle or two of the old, and mix it with the new making, as it quickens the fermentation, and makes it more brisk and lively. It is very common in India to boil a little lemon grass in the water, which gives a delicious flavour; some add ginger, or other spices. Porter, or other beer that is a little acid or pricked, but not so as to be vinegar, will, with the addition of sugar, or molasses, ferment and make excellent small beer. The quantity made must be, in warm climates, in proportion to the daily consumption, as it speedily turns sour. If this small beer is wanted in large quantities, it may be made in casks, in the same manner as spruce beer: but do not draw it entirely off; always reserve a proportion of the old to mix with the new. The ale to be taken to sea, for the purpose of making this beverage, ought to be made very strong; but by no means to be reduced to an extract, or such a substance, by boiling, as will evaporate

porate the vinous and active part of the malt liquor. Good strong ale, that will bear thrice its quantity of water, will be sufficient.

Some people in India ferment, in this way, Madeira, Claret, and even Champaign.— When punch was in general use in this country, it was customary in most families to make a quantity at once, and bottle it. Those who have drank punch thus bottled for some time, know that it undergoes a fermentation, and drinks very lively. This idea ought to be followed up with respect to the spirits now given to seamen on board a ship. The general system, at present, is, to issue it with three waters, and is termed grog. This is a bad beverage, being too strong; and it is well known that spirits tend more than any thing to promote the usual complaints of the liver and bilious affections. Were the same spirits put into a cask with six times the quantity of water, and a proportion of sugar or molasses, and allowed to ferment, it would, in a short period, make an excellent diet drink for the men, free from all the pernicious consequences that arise from the use of spirits. Wine can be fermented in the same way, and may be found more beneficial to the health of the men than in a pure state;

from the quantity of fixed air that it must contain in a state of fermentation.

It is asserted, by some very able chemists, that sugar and water will never ferment alone, requiring the assistance of yeast, or some other substance: perhaps refined sugar may be deprived of that active principle, But it is well known that molasses and water ferment without any assistance; and that bottled punch, consisting of spirits, lemon juice, sugar, and water, also undergoes a fermentation. Whether this depends, in the first, on the active powers which molasses is known to possess, or, in the other, on the vegetable acid of the lemons in conjunction with the sugar and water; are subjects to which the author calls the attention of abler men. His chief object at present is, to point out what is practicable for seamen to do, in order to commence fermentation, by the assistance of dry yeast, malt liquor, hops, or flour, either of malt or wheat, in conjunction with molasses or sugar; which, if once obtained in the smallest degree, may be increased and continued for ever, by a due attention in reserving a proportion of the old liquor to mix with the new. The process of fermenting liquor ought to be conducted in a similar manner

manner with that already recommended for baking bread. The whole of the substance to be fermented must not be mixed at once with water, but added gradually, as the fermentation advances. By this method, a very small quantity of yeast, or other substance capable of exciting fermentation, will suffice.

Glauber further recommends fine flour to be made from malt; bread to be made with it; then cut in slices, and dried in an oven, and taken to sea. Warm water is to be poured on a certain quantity of this bread, and allowed to ferment, which, he says, will produce a pleasant liquor. The farinaceous part which floats on the surface to be collected and made into a pudding, with sugar or butter, and to be eat by the seamen affected by the scurvy; who are also to drink the liquor in a state of fermentation. His idea of fine flour from malt is worthy of attention, as it takes little room, and may be found very beneficial in the scurvy; as pure yeast can be easily made from it, by the process already stated in the letter from Leith. This substance, given from time to time, in its natural state of fermentation, to those affected by the scurvy, there is every reason to suppose will have the same effect

of curing that disorder that it has been reported to possess in curing putrid sore throats and fevers. The experiment is easily made, without running any risks. Glauber also advises a small quantity of marine acid to be put into all the water of the ship to preserve it, and likewise into the salted provisions: the last, it is believed, is now adopted by the curers of salted provisions.

Having now given such directions as, if carefully followed, will enable the seamen to be fed with good soft bread, excellent drink, and on an improved system of cookery, it will be necessary to say something farther on such a state of cookery, applicable to the officers and petty officers of a ship; and shew how comfortably they may live on board, if they will give themselves a little trouble. As the author has been many years at sea, he is perfectly acquainted with the ignorance and inattention of our sea officers to this particular; and, as very few can have the convenience of live stock, they live very little better than the common seamen; and seldom carry any other thing to sea, on a cruise, than a few pieces of corned beef, a bag or two of potatoes, and some onions.

But if the following plan be followed, of
preparing

preparing fresh meat, they may have the comfort of a fresh meal every day, or as often as they please, at a moderate expence.

Make faufages of beef, mutton, veal, or pork, properly seasoned. Boil them moderately, and, when cold, coil them in a jar or keg; and, when full, clarify butter, by boiling it over a fire, and skimming it; and pour this, when warm, into the bung-hole of the cask until full, or on the top of the jar. If the voyage be long, put the jars or kegs into a cask of pickle, which will exclude the air, and keep it cool. Before the jars are put into pickle, let them be well corked and rofined. These faufages may be either boiled in water, or fried in the clarified butter which preserves them.

In short cruises, the following mode of preserving beef is recommended. Take beef, and chop and mince it very small; to which add some salt and pepper. Put this, in its raw state, into small jars, and pour on the top of it some clarified butter. When intended for use, put the clarified butter into a frying-pan, and slice some onions into the pan, and fry them. Add a little water to it, and then put in the minced meat. Stew it well; and in a few minutes it will be fit to serve

serve up.—This is a favourite dish in Scotland, and called Minced Collops. Few families are without it, as it keeps well, and is always ready to make an extra dish.

Fresh butter may be carried to sea in great perfection, by putting it into bladders, or into small pots, and then into pickle.

To render the pease soup, or barley broth, pleasant and palatable, fry onions in butter, and pour it into the soup.

To people living on shore, enjoying a comfortable fresh meal every day, these receipts may appear trifling; but to persons who are acquainted with a sea life, and have experienced what it is to live many months on salted provisions, they will appear very different. Variety, and change of food, is absolutely necessary, not only as a matter of pleasure and comfort, but towards the health of the individual. *Toujours perdrix* is a common proverb—how much more is it applicable to a person living for months on nothing but salted beef or pork, simply boiled in sea water. From want of change of food the stomach at last revolts against it; and it is constantly the case, that seamen consume less and less salted provisions in proportion as the voyage continues: and as there is no substitute

substitute in lieu of that food, the human frame becomes putrid and scorbutic, from an absolute want of a proper quantity of nourishment. This shews the necessity, in long voyages, of diminishing gradually the allowance of salted meat, and issuing other substitutes; of which soft bread and barley ought to constitute the chief part.—Another circumstance, of equal importance, claims attention. When ships arrive, after a long voyage, in port, it is customary to issue fresh provisions to the whole crew, as long as they remain in harbour. The consequence is, that the sudden change from salted to fresh provisions, with the great quantity they at first devour of the fresh, in proportion to what they had been accustomed to use of the diminished quantity of the other, occasions a flux, a complaint which at present destroys more seamen than the scurvy. Sudden changes of food are, at all times, prejudicial. A person accustomed to live entirely on vegetable food, if put upon an animal diet, is frequently fluxed, in the same manner as the person who had been fed on animal food on changing to a vegetable nourishment.

Seamen, therefore, on arriving from a long voyage, ought, at first, to have fresh
meat

meat only four times a week ; and, at all times, to have at least two days in the week salted provisions. This system is not only beneficial on their arriving in port, but also tends to render the change from fresh to salt, on again going to sea, less hurtful. Fluxes are the disorders which kill so many seamen at China, and in the Bengal rivers, and may chiefly be attributed to the feeding of the crew entirely on fresh meat while lying in the river, and ought to be corrected as soon as possible.

There is a practice now in use on board of the American whalers, who are generally out ten or twelve months on a voyage, that deserves to be mentioned. They take cider on board in casks, into which they put a quantity of sound apples. The apples are thus kept in high preservation ; and, as they draw off the cider, the apples are given to the men, to be either ate raw, or made into puddings.

The author will now conclude this treatise by shewing how to preserve the provisions on board from all kinds of vermin, whether rats, mice, wevil, coc-roaches, &c. &c. and effectually to clear the ship of them in all situations, whether at sea, or

or in a harbour. In doing this he can appeal, for the efficacy of the mode here recommended, to Captain Shanks of the navy, at present one of the commissioners of the Transport Board; who gave it a complete trial in Canada, in clearing some ships in that country of rats.

The same method was afterwards introduced in Bengal, not only to free the ships of rats, but also to clear them of other smaller vermin, of the insect kind, which, in all warm climates, are not only very disagreeable, but extremely destructive of provisions and other stores.

The plan consists in smoaking the ship with sulphur and nitre, in proper proportions, so as to destroy the atmospheric air under the hatches. Sulphur of itself would soon go out; but by the addition of nitre it is enabled to burn completely, as the nitre generates air to enable the sulphur to burn. The proportion is eight parts of sulphur to one part of nitre. Let them be well ground and mixed together. This proportion is found to be the best to burn sulphur in the making of the vitriolic acid.—The quantity to be used is two ounces of this composition to every cubic yard of contents of the ship, supposing

supposing the ship a cube. For instance: suppose a ship to be thirty yards long, ten broad, and eight deep: these, multiplied together, produce 2400, which, divided by 8, gives 300 pounds of composition; of which 266 $\frac{2}{3}$ pounds would be sulphur, and 33 $\frac{1}{3}$ pounds salt petre. Put this composition into iron pots, or tin pans, with a quantity of quick match teized out, and placed under and over the composition, so that all the parts may catch fire as soon as possible. Do not lay the composition thicker than three or four inches at most; otherwise the surface is liable to melt, and prevent the complete burning of the sulphur, &c. Arrange several of these in the hold, and the rest between decks. If in harbour, get a quantity of clay or mud on board, to plaster up all the crevices of the lining of the ship, and the parts where the smoke might escape. When all ready, light those in the hold first, a man at each pot, and make haste out; then light those on the decks, and lay over the hatches, and keep all close. Employ some men in looking round the ship, to examine wherever the smoke escapes, and plaster it up with clay. When in harbour it would be advisable to continue the hatches
 over

over for twenty-four hours ; but when the crew are on board, or at sea, it is recommended to begin early in the morning, and let it continue at least ten or twelve hours. On opening the hatches the smell soon goes off; and there is not that danger to be apprehended from the fumes of sulphur, as from foul air; as it gives previous warning by occasioning a cough.— This is the most complete method of fumigating a ship that can be tried, in all cases of infection or bad air, and will entirely free the ship of all vermin. All the rats and insects will be found dead upon the decks, generally near the pots. It has been remarked, that those rats that survived were completely blind, as the vitriolic fumes destroyed their eyes. Nor has any instance been known, in the number of ships that have been smoked in this manner, of any disagreeable smell arising from dead rats. The fact is, they die on the spot where they can procure air the longest; and it may easily be managed so as to draw them to a particular part of the ship, by clearing a passage, and leaving an air hole, to be shut at a particular stage of the process. There is no danger to be apprehended from fire, as, in fact, the fumes of sulphur extinguish it; and

as these are heavier than the atmospheric air, repels it from the hold.—The above composition has been therefore recommended as a mode of extinguishing fire on board a ship, to be used when other means have proved ineffectual.

In the case also of a leaky ship being put into dock for repair, these fumes, bursting from the secret, leaky seams in the most visible manner, serve as a guide to the carpenter where to look for the defect, and of course where to apply the remedy, without unnecessarily stripping the bottom; an operation which is not only attended with expence, but a waste of time, which, in war, is oftentimes so invaluable and critical.

THE END.



